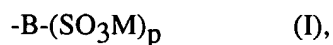


Patent claims

1. The use of silica sols containing sulfonic acid groups and/or mercapto groups as microparticles in paper production, in particular for paper retention.
2. The use as claimed in claim 1, characterized in that silica sols used are those which have, bonded to a silicon atom, a group of the formula I and/or II,



in which

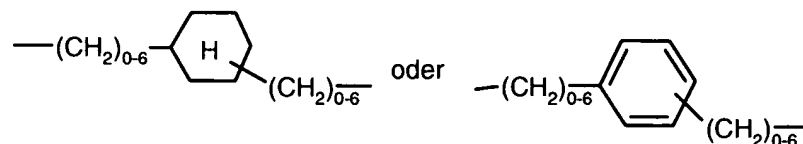
B is a (p+1)-valent bridge member,

p is a number from 1 to 3 and

M is hydrogen, an alkali metal, in particular Na, Li or K, an alkaline earth metal, in particular Mg, Ca or ammonium.

3. The use as claimed in claim 2, characterized in that

B is bivalent, p is 1, B is in particular a linear or branched alkylene group optionally interrupted by one or more oxygen atoms and having 1 to 15 C atoms, a cycloalkylene group having 5 to 8 C atoms or a unit of the formulae



4. The use as claimed in claim 2, characterized in that B is $-(\text{CH}_2)_n$ where n is from 1 to 6, in particular 3.

5. The use as claimed in claim 1, characterized in that the silica sol has a radical of the formula Ia,



in which

M is hydrogen, an alkali metal, an alkaline earth metal or ammonium.

6. The use as claimed in claim 1, characterized in that the silica sols have a mean particle size of less than 400 nm, determined by the TEM method.
7. The use as claimed in claim 1, characterized in that the silica sol is used in combination with cationic polymers as a microparticle system in paper production.
8. The use as claimed in claim 7, characterized in that polyethylenimines, polyamidoamines, polyacrylamides, polyvinylamines, starch or guar flour is used as the cationic polymer.
9. A process for the production of paper, characterized in that a silica sol containing sulfonic acid groups and/or mercapto groups and a cationic polymer are added to an aqueous cellulose suspension in any desired sequence, and sheet formation, drainage and drying of the sheet are then carried out.
10. A silica sol containing sulfonic acid groups and/or mercapto groups and having a mean particle size, measured according to TEM, of 2-45 nm, preferably of 2-20 nm.
11. A silica sol containing sulfonic acid groups and/or mercapto groups and having a sulfur content, based on SiO₂ of the silica sol, of from 0.1 to 30 mol%, preferably from 0.1 to 8 mol%, in particular from 1 to 5 mol%.
12. The silica sol as claimed in claim 10 and/or 11, characterized in that it has a radical of the formula – (CH₂)₃-SO₃M, in which M is H, an alkali metal, an alkaline earth metal or ammonium.
13. A process for the preparation of the silica sols according to claim 10 and/or 11, characterized in that a silica sol which is free of SH and SO₃M groups and in which M has the above meaning,
for the optional introduction of the SH groups,
a) is reacted with mercapto compounds and
for the optional introduction of the sulfonic acid groups,
b) is reacted with a compound containing SO₃M groups or

b1) is reacted with a compound containing a functional group and the functional group itself is converted into an SO_3M group, in particular the mercapto compound obtained according to a) is oxidized, or

b2) is reacted with a compound containing a functional group and the silica sol derivatized in this manner is further reacted with a compound containing SO_3M groups,

the reaction is carried out in an aqueous medium having a water content of at least 75% by weight in at least one of the stages a), b), b1) or b2), based on the mass of the respective reaction mixture.

14. A silica sol obtainable by a process as claimed in claim 13

15. A paper characterized in that it contains a silica sol as claimed in claim 10, 11, 12 or 14.